

REMARKS

Claims 1-29 are pending in the application. Claim 1-29 stand rejected variously under 35 U.S.C. §§ 112, 102(b), and 103(a). Claims 19 and 27 have been cancelled. Claims 1, 3-6, 8-16, 20, 21, 23, 25, 26, and 28 have been amended, leaving claims 1-18, 20-26, 28, and 29 for consideration upon entry of this amendment. No new matter has been entered.

OBJECTIONS

The remarks inadvertently interspersed with claim 11 have been omitted as required by the Examiner.

The disclosure stands objected to because the Examiner alleges that there is no teaching of the dipole field recited in claims 1 and 8. Claims 1 and 8 have been amended to define a first dipole field between backing 36 and cathode front member 32 in contrast to a second dipole field between the cathode assembly 22 and anode 18 as recognized by one skilled in the pertinent art. Thus it is respectfully requested that the objection to the "dipole field" with respect to claims 1 and 8 be withdrawn.

§112 REJECTIONS

Claims 1-11, 13, 14, 19, 20, 21, 25-28 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to the limitations conveyed by "dipole field" in claims 1 and 8 as discussed above, claims 1 and 8 have been amended to differentiate and define a "first dipole field" and "second dipole field" in each of the respective claims. Thus it is respectfully requested that the rejection to claims 1 and 8 be withdrawn.

Claims 6, 14, 21, and 26 have been amended to delete any reference to the term "gridding" in each of these claims rendering such rejection moot. Accordingly, it is

respectfully requested that rejection thereto be withdrawn.

Claims 5, 6, 13 and 14 stand rejected because the Examiner states that these claims recite no steps to be performed and fail to further define or limit the method of claim 1. Claims 5 and 6 have been amended in conformance to further limit the method of claim 1, while claims 13 and 14 have been amended in conformance to further limit the method of claim 12.

Claims 9, 10, 19, 27, and 28 stand rejected to because the Examiner alleges that the meaning of "larger" with respect to claims 9 and 27 and "increasing" with respect to claims 10, 19 and 28 are obscure. Claims 19 and 27 have been canceled rendering any rejection thereto moot. Claims 9, 10, and 28 have been amended to cure the obscure reference to "larger" and "increasing" with relation to an emitter having a circular cross section. Accordingly, it is respectfully requested that rejection to claims 9, 10, and 28 be withdrawn.

Claims 20, 21, 25 and 26 stand rejected to because the Examiner alleges that they fail to further limit the structure recited in parent claim 15. It is respectfully noted that claims 20 and 21 have been amended to further limit claim 15 from which they depend, while claims 25 and 26 have been amended to further limit claims 23 from which they depend. Accordingly, it is respectfully requested that the rejection to claims 20, 21, 25, and 26 be withdrawn.

The Amendments here presented are made for the purposes of better defining the invention, rather than to overcome the rejections for patentability. No presumption should therefore attach that the claims have been narrowed over those earlier presented, or that subject matter or equivalents thereof to which the Applicants are entitled has been surrendered.

§102 REJECTIONS

Claims 1-7, 9, 10 and 12-29 are rejected under 35 U.S.C. S 102(b) as being

anticipated by Gravelle et al (5633907). Applicant respectfully traverses.

The Examiner alleges that Gravelle teaches an x-ray tube 10 comprising vacuum housing 11, anode 12 with a focal spot 17, differentially biased cathode 15 for emitting an electron beam 16 toward the anode and high voltage power supply means for creating a dipole field between the anode and cathode (lines 59-66 of column 2). The Examiner further alleges that the "dipole field" claimed is not defined by applicant.

More specifically, the dipole field is defined by applicant as a field generated between the back electrode or backing 36 and aperture 30 defined by cathode front member 32 (i.e., V_{back} and V_{aperture} , see also Figure 5). The reference to "differentially biased cathode" indicates what dipole is referred to as the dipole field is not to be confused with the cathode/anode dipole voltage which is taught in Gravelle and relied on by the Examiner. Moreover, as discussed above, claims 1 and 8 have been amended to particularly point out this distinction.

In particular, Gravelle teaches a "cathode with a large cavity in which an electron cloud is generated and which is shielded from the primary electric field between the cathode and the anode." See Abstract. The cavity and the electric fields generated within the cavity ("forcing field") are essential for operation. The exiting electron cloud from passage 22 (in shielded cavity 21) is caught up in the primary field between cathode assembly 19 and anode 13 to become electron beam 16. Col. 3, lines 22-25.

In fact, Gravelle teaches away from applicant's invention, in that Gravelle teaches that "[a]n important advantage of this invention is that the supply of electrons for beam 16 is generated in an isolated or shielded location removed from deleterious effects of the primary electrical field, i.e. in cavity 21 of focusing cathode unit 19." (Emphasis added.) Col. 3, lines 26-30.

Gravelle does not teach or suggest, and in fact teaches away from, emitting an electron beam along a beam path from an emitter of a cathode; producing a first dipole field between a backing and an aperture defined by said cathode within said electron

beam with a differentially biased cathode and immersing said first dipole field and said differential bias within said electron beam to focus and deflect said electron beam onto a focal spot on an anode to cause X-rays to be emitted from said anode, as in amended claim 1. Thus, claim 1, including claims depending therefrom, i.e., claims 2-11, define over Gravelle.

Gravelle does not teach or suggest, and in fact teaches away from, an emitter situated therein for emitting an electron beam to a focal spot on the anode during operation of the x-ray tube, a cathode front member having an aperture defined by the cathode front member on a first side of the emitter, and a backing disposed on an opposite second side of the emitter and connected to the cathode front member via a backing insulator, wherein the cathode front member and backing are independently biased producing a first dipole field between said backing and said aperture defined by said cathode front member immersing said emitter in said first dipole field within said electron beam to shape and accelerate the electron beam and guide the electron beam to the focal spot on the anode, as in amended claim 12 and similarly claimed in claims 15 and 23. Thus, claims 12, 15, and 23 including claims depending therefrom, i.e., claims 13, 14, 16-18, 20-26, 28, and 29, define over Gravelle.

Accordingly, it is respectfully requested that the rejection to claims 1-7, 9, 10 and 12-29 be withdrawn.

§103 REJECTIONS

Claims 8 and 11 stand rejected under 35 U.S.C. S 103 as being unpatentable over Gravelle in view of Wolbarst. Applicant respectfully traverses.

The Examiner states that Gravelle does not mention specific focal spot size or cathode/anode (dipole) voltage, but page 256 of Wolbarst has a table listing typical x-ray tube focal spot size from 0.05 mm to 2 mm, and page 100 indicates that high voltage typically ranges from 40-150 Kv, and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the Gravelle system within these parameters.

It is respectfully pointed out that claims 8 and 11 depend from claim 1 which is submitted as being allowable for defining over Gravelle as discussed above. Furthermore, it is respectfully noted that operation of the Gravelle system within the above recited parameters as allegedly taught by Wolbarst does not cure the deficiencies noted above with respect to Gravelle. Thus, it is respectfully requested that the rejection to claims 8 and 11 be withdrawn.

CONCLUSION

In view of the above-presented amendments and accompanying remarks, it is respectfully submitted that all of the pending claims, Claims 1-18, 20-26, 28, and 29 are patentable over the prior art and allowance is respectfully requested.

If, however, any issues remain, the Examiner is cordially invited to contact the undersigned so that such issues may be promptly resolved.

In the event any further fees are due with respect to this amendment or otherwise, please charge them to Deposit Account No. 07-0845 maintained Applicants' Assignee.

Respectfully submitted,

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